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23. (Amended) A method for removing a coating and an oxide material from a substrate, comprising the step of exposing the substrate to an aqueous composition under conditions sufficient to remove substantially all of the oxide material and substantially all of the coating, wherein the aqueous composition comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6, and wherein the precursors to said acid comprise any compound or group of compounds which can be combined to form the acid or its dianion AF_6^{-2} under reactive conditions.

Attached hereto are a marked-up version of the Claims and a clean version of the Claims, incorporating the amendments made herein. The attached pages are captioned "Claims With Markings to Show Amendments Made" and "Clean Version of All Claims," respectively.

REMARKS:

This Amendment and Response to Non-Final Office Action Under 37 CFR 1.111 is being submitted in response to the non-final Office Action dated August 14, 2002. Claims 1-34 are pending in the Application. Claims 1-5, 9, 10, 12, 15-19, 22, and 23 stand rejected under 35 USC 102(b) as being anticipated by Sullivan et al. (GB 2115013A). Claims 6, 14, and 24-26 stand rejected under 35 USC 103(a) as being unpatentable over Sullivan as applied to Claims 1-5, 9, 10, 12, 15-19, 22, and 23, and further in view of Awad (U.S. Patent No. 5,030,323). Claims 7 and 8 stand rejected under 35 USC 103(a) as being unpatentable over Sullivan and Awad as applied to Claims 1-5, 6, 9, 10, 12, 14-19, and 22-26, and further in view of Matsuno et al. (U.S. Patent No. 6,261,969). Claims 10, 11, 20, and 21 stand rejected under 35 USC 103(a) as being unpatentable over Sullivan as applied to Claims 1-5, 9, 10, 12, 15-19, 22, and 23. Claims 27-34 stand rejected under 35 USC 103(a) as being unpatentable over Sullivan as applied to Claims 1-5, 9, 10, 12, 15-19, 22, and 23, and further in view of Grunwald (U.S. Patent

No. 3,373,114). The drawings have also been objected to for being informal and Claim 1 has been objected to for containing informalities.

In response to these rejections and objections, Claims 1 and 23 have been amended to further clarify the subject matter of the present invention. These amendments are fully supported in the specification and drawings of the Application.

Drawings:

This Application has been filed with informal drawings which are acceptable for examination purposes only, as indicated by Examiner. Formal drawings will be submitted when the Application is allowed

Objection to Claim 1:

Examiner states that "Claim 1 is objected to because of the following informalities: Examiner suggests in replacing [the] between "from" and "surface" with --a-- in line 1 of Claim 1."[1] Accordingly, Claim 1 has been amended to replace [the] between "from" and "surface" with --a-- in line 1 of Claim 1.

REJECTION OF CLAIMS 1, 23, 24, AND 27 UNDER 35 USC 102(b) / 35 USC 103(a):

Claims 1, 23, 24, and 27 each stand rejected under 35 USC 102(b) and/or 35 USC 103(a) based upon Sullivan et al. (GB 2115013A). Specifically, with respect to Claims 1 and 23, Examiner states that "[t]he claimed invention reads on Sullivan as follows: Sullivan discloses a method for removing an oxide material from a surface of a substrate or a coating disposed on the substrate comprising the step of contacting the oxide material with an aqueous composition which comprises a precursor to an acid having the formula H_xAF_6, wherein A is Al and X is 3 (page 2, lines 47-55)..."[2]

[1] Office Action, p. 2.
[2] Office Action, p. 2.

However, Sullivan et al. discloses that "[a]nother constituent of the bath which although not essential is highly preferred, is the addition of a soluble fluorine-containing species, most preferably fluoroboric acid, HBF_4, but other fluorine-containing species, e.g., HF, NH_4HF_2, Na_3AlF_6, et al., that can disassociate in aqueous solution to generate low fluoride ion concentrations , are particularly suitable."[3]

Sullivan does not disclose, teach, or suggest "contacting the oxide material with an aqueous composition which comprises ***an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6***," as recited in Claims 1, 23, and 27. Likewise, Sullivan does not disclose, teach, or suggest "contacting the oxide material with an aqueous composition which comprises ***H_2SiF_6 or H_2ZrF_6, or mixtures thereof***," as recited in Claims 24.

Thus, Applicant submits that Claims 1, 23, 24, and 27 contain elements and/or limitations not disclosed, taught, or suggested by Sullivan et al. and that the rejections of Claims 1, 23, 24, and 27 have been traversed. Therefore, Applicant respectfully requests that the rejections of Claims 1, 23, 24, and 27 under 35 USC 102(b) and/or 35 USC 103(a) be withdrawn.

REJECTION OF CLAIMS 2-22, 25, 26, AND 28-34 UNDER 35 USC 102(b) / 35 USC 103(a):

Because Claims 2-22, 25, 26, and 28-34 are dependent from independent Claims 1, 23, 24, and 27, and because Claims 1, 23, 24, and 27 contain elements and/or limitations not disclosed, taught, or suggested by Sullivan et al., Applicant submits that the rejections of Claims 2-22, 25, 26, and 28-34 under 35 USC 102(b) and/or 35 USC 103(a) have been traversed and respectfully requests that the rejections be withdrawn.

[3] Sullivan et al., p. 2, lines 47-50.

CONCLUSION:

Applicant would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in better form for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, address, or email address provided below. It is not believed that any fees for extensions of time, additional claims, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such fees are required, they are authorized to be charged to Deposit Account No. 04-1448.

Respectfully submitted,

Date: 24 September, 2002

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CLAIMS WITH MARKINGS TO SHOW AMENDMENTS MADE

In accordance with 37 CFR 1.121(c)(1), the following version of the Claims, as rewritten by the foregoing amendments, shows the changes made relative to previous versions of the Claims. Material added is shown in underlined text and material deleted is shown in [brackets].

1. (Amended) A method for removing an oxide material from [the] a surface of a substrate or a coating disposed on the substrate, comprising the step of contacting the oxide material with an aqueous composition which comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6.

2. The method of claim 1, wherein x is 1-3.

3. The method of claim 1, wherein the acid is present at a level in the range of about 0.05 M to about 5 M.

4. The method of claim 3, wherein the acid is present at a level in the range of about 0.2 M to about 3.5 M.

5. The method of claim 1, wherein the precursor is a salt of the acid.

6. The method of claim 1, wherein the aqueous composition comprises the compound H_2SiF_6, H_2ZrF_6, or mixtures thereof.

7. The method of claim 6, wherein the H_2SiF_6 compound is formed in situ within the aqueous composition, by the dissociation of a corresponding salt of the compound; or by the reaction of a silicon-containing compound with a fluorine-containing compound.

8. The method of claim 7, wherein the silicon-containing compound is SiO_2, and the fluorine-containing compound is HF.

9. The method of claim 1, wherein the aqueous composition further comprises at least one additional acid or precursor thereof.

10. The method of claim 9, wherein the additional acid has a pH of less than about 7 in pure water.

11. The method of claim 10, wherein the additional acid has a pH of less than about 3.5 in pure water.

12. The method of claim 9, wherein the additional acid is a mineral acid.

13. The method of claim 9, wherein the additional acid is selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, hydrobromic acid, hydriodic acid, acetic acid, perchloric acid, phosphorous acid, phosphinic acid, alkyl sulfonic acids, and mixtures of any of the foregoing.

14. The method of claim 9, wherein the additional acid is phosphoric acid.

15. The method of claim 9, wherein the additional acid is present at a level less than about 80 mole %, based on the total moles of acid present in the aqueous composition.

16. The method of claim 15, wherein the additional acid is present at a level within in the range of about 20 mole % to about 70 mole %.

17. The method of claim 1, wherein the oxide material is treated in a bath of the aqueous composition.

18. The method of claim 17, wherein the bath is maintained at a temperature in the range of about room temperature to about 100°C, during treatment.

19. The method of claim 18, wherein the temperature is in the range of about 45°C to about 90°C.

20. The method of claim 18, wherein the treatment time is in the range of about 10 minutes to about 72 hours.

21. The method of claim 20, wherein the treatment time is in the range of about 60 minutes to about 20 hours.

22. The method of claim 17, wherein the bath further comprises at least one additive selected from the group consisting of inhibitors, dispersants, surfactants, chelating agents, wetting agents, deflocculants, stabilizers, anti-settling agents, reducing agents, and anti-foam agents.

23. (Amended) A method for removing a coating and an oxide material from a substrate, comprising the step of exposing the substrate to an aqueous composition under conditions sufficient to remove substantially all of the oxide material and substantially all of the coating, wherein the aqueous composition comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6, and wherein the precursors to said acid comprise any compound or group of compounds which can be combined to form the acid or its dianion AF_6^{-2} under reactive conditions.

24. A method for removing an oxide material from a diffusion- or overlay coating on the surface of a turbine engine component, comprising the step of contacting the oxide material with an aqueous composition which comprises H_2SiF_6 or H_2ZrF_6, or mixtures thereof.

25. The method of claim 24, wherein the aqueous composition further comprises an additional acid selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, and mixtures thereof, wherein the additional acid is present at a level less than about 80 mole %, based on the total moles of acid present in the aqueous composition.

26. The method of claim 24, wherein the oxide material is also initially present in at least one cavity within the turbine engine component, and is removed therefrom during treatment with the aqueous composition.

27. A method for replacing a worn or damaged protective coating applied over a substrate, comprising the following steps:

(i) removing an oxide material from the surface of a coating disposed on the substrate, by contacting the oxide material with an aqueous composition which comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6;

(ii) removing the coating disposed on the substrate, by contacting the coating with an aqueous composition which comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, Zr, Al, and Ga; and x is 1-6; and then

(iii) applying a new coating to the substrate.

28. The method of claim 27, wherein steps (i) and (ii) are carried out simultaneously, using the same aqueous composition.

29. The method of claim 27, wherein oxide material which directly contacts the substrate is also removed in step (i).

30. The method of claim 28, wherein the aqueous composition further comprises at least one additional acid or precursor thereof.

31. The method of claim 30, wherein the additional acid is selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, hydrobromic acid, hydriodic acid, acetic acid, perchloric acid, phosphorous acid, phosphinic acid, alkyl sulfonic acids, and mixtures of any of the foregoing.

32. The method of claim 27, wherein the coating removed in step (ii) and the coating applied in step (iii) are each selected from the group consisting of diffusion coatings and overlay coatings.

33. The method of claim 27, wherein the new coating of step (iii) is applied by a technique selected from the group consisting of vacuum plasma spray (VPS); air plasma spray (APS); high velocity oxy-fuel (HVOF); sputtering; physical vapor deposition (PVD); electron beam physical vapor deposition (EB-PVD); and diffusion-aluminiding.

34. The method of claim 1, wherein the substrate is a metallic material or a polymeric material.